WHAT IS CLAIMED IS:

1. An apparatus for evaluating a polysilicon film formed on annealing an amorphous silicon film, comprising:

a stage for setting a substrate thereon, said substrate carrying a polysilicon film formed thereon;

an optical system for observation with the visible light, said optical system illuminating the visible light on said substrate on said stage for photographing a surface image of said polysilicon film on said substrate to effect auto-focusing;

an optical system for observation with UV light, said optical system illuminating the UV light on said substrate on said stage for acquiring a surface image of said polysilicon film on said substrate, auto-focused using said optical system for observation with the visible light; and

evaluation means for evaluating the linearity and periodicity of a spatial structure of the film surface of said polysilicon film from the surface image of said polysilicon film acquired by said optical system for observation with UV light to evaluate the state of said polysilicon film based on the results of evaluation of said linearity and periodicity.

2. The polysilicon film evaluation apparatus according to claim 1 wherein the wavelength of said UV light is shorter than an evaluation period of said polysilicon film multiplied by NA of an objective lens for observation in said optical system.

3. The polysilicon film evaluation apparatus according to claim 1 or 2 wherein said

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stage may be switched between a first state in which said stage is mounted on a support via oscillation preventative means designed for preventing oscillations of said stage so that an oscillation preventative operation by said oscillation preventative means occurs and a second state in which said stage is secured to said support so that said oscillation preventative operation ceases.

4. The polysilicon film evaluation apparatus according to any one of claims 1 to 3 wherein said optical system for observation with the visible light and said optical system for observation with the UV light are constructed as one integral unit.

5. The polysilicon film evaluation apparatus according to claim 4 wherein said unit is detachably loaded at an upper portion of a main body unit of the apparatus where said stage is mounted.

6. The polysilicon film evaluation apparatus according to any one of claims 1 to 5 further comprising:

a rotatable revolver integrally carrying thereon an objective lens for visible light of said optical system for observation with the visible light and an objective lens for UV light of said optical system for observation with UV light wherein the state of use of said objective lens for visible light and said objective lens for UV light is changed over on rotational operation of said revolver.

7. The polysilicon film evaluation apparatus according to claim 6 further comprising:

light volume control means for controlling the volume of illuminated light of at least one of said optical system for observation with the visible light and said optical

system for observation with UV light;

said light volume control means including a reflection mirror for reflecting the illuminated light for monitoring the volume of illuminated light; and

said reflecting mirror being provided in a vacant region of said revolver.

8. The polysilicon film evaluation apparatus according to any one of claims 1 to 7 wherein said stage is movable along three axes perpendicular to one another, that is along X-, Y- and Z-axes;

the upper limit position along the Z-axis direction of said stage being set as a function of XY coordinates in meeting with smoothness of an XY plane of said stage.

9. The polysilicon film evaluation apparatus according to according to any one of claims 1 to 8 wherein said evaluation means captures a plurality of surface images of said polysilicon film with different focus values, by said optical system for observation with UV light, to acquire an image with best focus; and wherein said evaluation means has the learning function of acquiring the image of the best focus with a lesser number of images captured with an increasing number of times of evaluation operations.